Appl. No. 10/087,153
Amdt. dated May 17, 2005
Reply to Office Action of December 9, 2005

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1.   (currently amended) A computer-implemented method for separating a tooth from adjacent structure, comprising:

defining a cutting surface; and

applying the cutting surface between the tooth and the structure to separate the tooth from the structure in a single cut,

wherein applying the cutting surface includes reconstructing a root of the tooth.

2.   (original) The method of claim 1, wherein the cutting surface is curved.

3.   (original) The method of claim 1, wherein the cutting surface is expressed as a function.

4.   (original) The method of claim 1, wherein the cutting surface is expressed as a spline function and a quadratic function.

5.   (original) The method of claim 1, wherein the cutting surface is expressed as a spline function and a parabolic function.

6.   (original) The method of claim 1, wherein the cutting surface is interactively adjusted.

7.   (original) The method of claim 4, wherein the interactive adjustment of the cutting surface modifies a function defining the cutting surface.

8.   (original) The method of claim 4, further comprising interactively highlighting the separated portion.

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9.　　(original)　The method of claim 8, further comprising interactively highlighting the border of the separated portion.

10.　　(original)　The method of claim 1, wherein the cutting surface is defined by specifying a basis for the tooth.

11.　　(original)　The method of claim 1, wherein the structure is a gingiva, further comprising finding a line between a tooth surface and the gingiva and applying the cutting surface to said line.

12.　　(original)　The method of claim 11, further comprising finding a high curvature location on the tooth surface.

13.　　(original)　The method of claim 11, further comprising fitting a spline to the line.

14.　　(original)　The method of claim 1, wherein the cutting surface further comprises a plurality of surfaces.

15.　　(original)　The method of claim 14, wherein the root of the tooth is modeled as a parabolic surface below a gingival line.

16.　　(original)　The method of claim 14, further comprising defining an enclosing surface to enclose the crown of the tooth.

17.　　(original)　The method of claim 14, further comprising:
displaying the surface specified with a plurality of nodes;
adjusting one or more nodes to modify the surface; and
applying the surface to separate the gingiva from the tooth.

18.　　(original)　The method of claim 17, further comprising providing a handle to adjust each orientation of the cutting shape.

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19.　　(original)　The method of claim 17, wherein adjusting one or more nodes further comprises moving one or more nodes.

20.　　(original)　The method of claim 17, wherein the cutting surface is formed using a function in a cylindrical coordinate system.

21.　　(currently amended)　A system for separating a tooth from adjacent structure, comprising:

means for defining a cutting surface; and

means for applying the cutting surface between the tooth and the structure to separate the tooth from the structure in a single cut; and

means for reconstructing a root of the tooth.

22.　　(currently amended)　A computer program, residing on a tangible storage medium, for use in separating a computer model of a tooth from a computer model of a dental structure, the program comprising executable instructions operable to cause a computer to:

define a cutting surface; and

apply the cutting surface between the tooth and the structure to separate the tooth from the structure in a single cut,

wherein applying the cutting surface includes reconstructing a root of the tooth.

23.　　(currently amended)　A computer program, residing on a tangible storage medium, for use in separating a computer model of a tooth from a computer model of a dental structure, the program comprising executable instructions operable to cause a computer to:

define a cutting surface, wherein the cutting surface is expressed as a spline function and a quadratic function; and

apply the cutting surface between the computer model of the tooth and the computer model of the dental structure to separate the computer model in a single cut,

wherein applying the cutting surface includes reconstructing a root of the tooth.

24.　　(currently amended)　A computer, comprising:

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a processor;

a data storage device coupled to the processor, the data storage device containing code for use in separating a computer model of a tooth from a computer model of an adjacent dental structure, the program comprising executable instructions operable to cause a computer to:

define a cutting surface, wherein the cutting surface is expressed as a spline function and a quadratic function and wherein the cutting surface further comprises a plurality of surfaces and wherein the root of the tooth is modeled as a parabolic surface below a gingival line; and

apply the cutting surface to the tooth to separate the tooth from the dental structure in a single cut,

wherein applying the cutting surface includes reconstructing a root of the tooth.

25.   (original) The system of claim 24, further comprising instructions to define an enclosing surface to enclose the crown of the tooth.